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NOVEMBER 12, 1949

TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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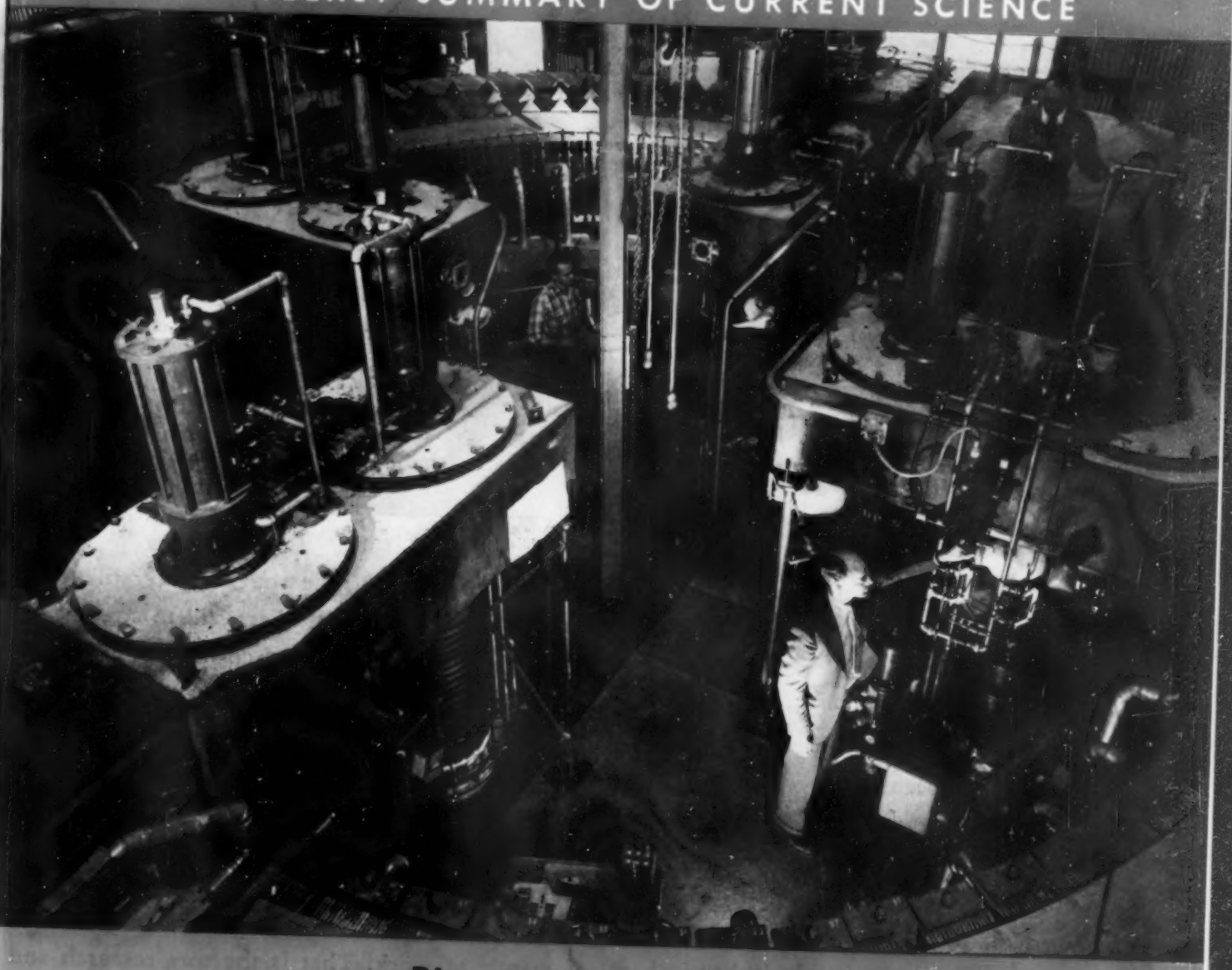
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Biggest Bevatron Yet

See Page 308

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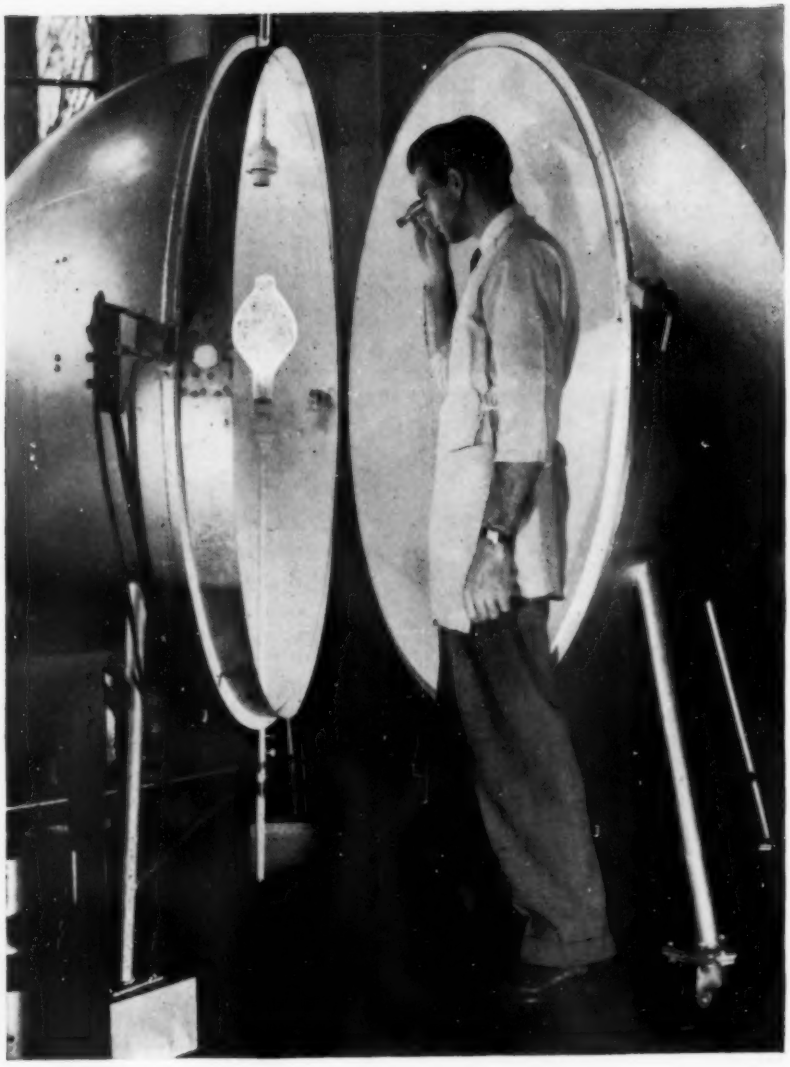
What is a LAMP?



Way back when, before the days of modern research, the answer to this simple question was easy. Today, the definition grows complex.

A Westinghouse engineer in the lamp research department would visualize the 10,000 types and sizes of lamps the company makes. Standard incandescent and fluorescent. Heat lamps. Mercury vapor and fluorescent sun lamps. Bacteria-killing Sterilamps*. Talking lamps. Lamps to provide black light. Non-seeing mercury vapor to create photochemical reaction. The new quartz tube filled with krypton with a brilliance nine times greater than the sun. On and on. And others still to come.

With a glow of satisfaction, this research specialist would revel in the way research has expanded the applications of a lamp. And with due pride.

To Westinghouse, research is a basic element of success. Across its broad fields of operation, from toasters to turbines, the benefits of research in all its forms are brought to bear . . . are constantly at work. That is the way research and business can contribute the most to America.

*Reg. T. M.

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YOU CAN BE SURE . . . IF IT'S Westinghouse

GEOPHYSICS

Sun to Earth Energy Link

Discovery of a layer of "excited" oxygen molecules in the ionosphere may lead to better long-range weather forecasting. This is the fourth main layer found.

➤ A HITHERTO unknown layer of "energetic" oxygen molecules in the earth's upper atmosphere, has been discovered by Dr. Joseph Kaplan, University of California at Los Angeles physicist.

It may prove to be one of the most important links in the chain along which solar energy passes in its journey from sun to earth, he says.

Lying in the ionosphere near the regions of the colorful aurora borealis and the softer greenish glow of the light of the night sky, this layer of "excited" molecules may be an important factor in the sun-powered earth's weather factory, thinks Dr. Kaplan. It also may perform a vital function in the extensive processing that solar energy undergoes before it reaches the earth.

Further investigation in this unexplored region may pave the way for accurate long-range weather forecasting, states the U.C.L.A. physicist. Learning what this region does with the enormous amounts of energy thrown out during sunspot activity may enable meteorologists to chart our weather months in advance.

Strangely enough, this new layer was first discovered not by rockets probing the vast reaches of the upper atmosphere, but in a bottle in a secluded laboratory at U.C.L.A.

Several years ago Dr. Kaplan first noted in a specially designed quartz bottle, in which gases were excited by electrical discharges, a new form of nitrogen molecule. Recently he discovered in the same bottle a similar form of oxygen. He called these molecules "energetic" or metastable nitrogen and oxygen molecules.

Considering the conditions under which these molecules were produced, he reasoned that a layer of such molecules existed in the upper atmosphere where these conditions were duplicated.

Current spectroscopic studies of the upper atmosphere by Dr. A. B. Meinel at the University of California Lick Observatory indicated verification of Dr. Kaplan's discovery.

The new layer is the fourth main layer to be discovered in the ionosphere, the region of the atmosphere that bounces back radio waves. Previously discovered layers are the E layer and the F1 and F2 layers, whose average heights are 70, 125 and 150 miles, respectively.

At present there is no way of knowing exactly where the new layer is located. "However, our knowledge of the conditions it takes to produce these particular molecules leads us to believe that it is located just below the ionosphere's E layer and just above the ozone layer, probably about 60 miles above the earth's surface," Dr. Kaplan says.

Temperatures at this height are almost zero degrees Centigrade, and the infra-red intensity is much more than had been previously supposed at this altitude.

Until the discovery of the new layer the ozone layer beneath was credited with being the sole shield that protected us from lethal ultraviolet rays. Now it is thought that much of the ultraviolet radiation is transformed to infra-red radiation in the newly-discovered layer above the ozone.

"We are now branching out from the laboratory phase of study of this new layer," Dr. Kaplan says. "As we probe it with rockets and other research tools, we may find that it is the missing link needed to fill out the puzzling chain of solar-terrestrial relationships."

Science News Letter, November 12, 1949

BIOCHEMISTRY

Cobalt Essential to Life

➤ COBALT is one of the most essential elements in the very fundamentals of life processes and the cobalt-containing anti-pernicious anemia vitamin B-12 is the most powerful factor in the health of living things ranging from man to the green scum on ponds.

This was indicated by Dr. S. H. Hutner, of the Haskins Laboratories, New York, to the American Philosophical Society in Philadelphia.

In experiments with one-celled algae he has shown that cobalt enters into the molecules of the B-12 vitamin, which in turn is concerned with the manufacture of desoxyribosenucleic acid that is used by the bearers of heredity, the minute genes, which provide the life chain in reproduction.

We know much less about the metals requisite for life in trace amounts than we know about the organic constituents of living things, Dr. Hutner said. Iron, manganese, zinc, and copper, in addition to cobalt, are known to be necessary to both ani-

INSTRUMENT MAST FOR FLIGHT DATA—This needle-nosed "spear" probes the atmosphere ahead of high-speed research planes to give instant telemetered readings of air speed, yaw, angle of attack and temperature. It was developed by G. M. Giannini & Co., for Northrop Aircraft, Inc., and is undergoing tests now, being the first all-electric instrument mast to be designed for this use.

mals and plants, while molybdenum, boron and possibly other metals are needed by plants and possibly by animals.

The green alga known as *Euglena gracilis* corresponds to human beings in its need for various elements, Dr. Hutner said, and it can be used as a test animal for assaying the amount of vitamin B-12 and the effectiveness of liver extract.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Giant Atom Smasher

See Front Cover

➤ A GIGANTIC machine with powder-puff nuclear punch has demonstrated for the first time in actual practice that multi-million dollar cosmic ray atom-smashers being financed by Uncle Sam will deliver the goods.

The machine is a quarter-scale model of the 6,000,000,000 volt bevatron now under construction at University of California Radiation Laboratory with Atomic Energy Commission funds.

Though only a model and capable of firing protons to only 6,000,000 electron volts, this machine is the biggest atom smasher yet. It has a near-oval magnet and accelerating chamber 25 feet in diameter, as shown on this week's cover of the SCIENCE NEWS LETTER. The path over which protons travel in one trip around the chamber is 100 feet, by far the longest in atom-smashing history.

Prof. Ernest O. Lawrence told University regents that the machine operates with efficiency "equalling our most optimistic advance estimates." The model proves that the revolutionary principles incorporated in the bevatron are practicable. Further experience gained will speed up the shake-down of full scale machine by many months. It will also make it possible to start the machine at 3,500,000,000 electron volts instead of 1,400,000,000 electron volts. The conversion to 6,000,000,000 electron volts will be only one stage further. The completion of the full scale machine is four years away.

The model simulating the conditions of the big machine operates as follows: A ten-ton cyclotron, reminiscent of early ones, acts as injector, firing 20 bursts of protons a minute into the chamber at three-second intervals. An electrode in the chamber speeds protons up each time around. As protons gain energy, magnet strength is increased to keep them from straying out of their orbit. Also the frequency of the electrode pushes is slowed down to match a slight lagging tendency of the protons at higher energy. During the two-tenths of a second the protons are in the chamber they make 150,000 trips around the chamber, traveling 10,000 miles. Each burst of protons contains 100,000,000 particles.

The full scale machine is now being constructed. It will duplicate in the laboratory the cataclysmic atomic disintegrations now achieved only in the medium energy range of cosmic rays. And it will give physicists a better handle on the still mysterious force which holds nuclei together. A 3,000,000,000 electron volt accelerator is also being built at Brookhaven.

Science News Letter, November 12, 1949

PHYSICS

See Atoms and Sun As Future Energy Sources

➤ THE atom and the sun will be the source of our energy in the future, when the world's coal and oil supplies are exhausted, Dr. Farrington Daniels of the University of Wisconsin, predicted.

Speaking before the University of Michigan chapter of the Society of Sigma Xi, national society for the encouragement of scientific research, he stated that direct use of sunlight as a power source, though simpler politically than the use of atomic energy, was more difficult technically. Dr. Daniels recommended coordination of all the research work on utilization of solar energy.

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ANTHROPOLOGY

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Photographs: Cover, University of California; p. 307, Northrop Aircraft, Inc.; p. 309, U. S. Rubber Co.; p. 311, Libbey-Owens-Ford Glass Co.; p. 314, Carnegie Institution of Washington.

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ARCHAEOLOGY

An American "Iron Age"?

Iron objects found in prehistoric sites in this country have raised the question did America have iron before Columbus?

➤ DID pre-Columbian "First Families" of Virginia and Ohio know how to smelt iron and make nails, horseshoes and tools of iron?

The controversial question of Viking discovery and penetration of America is raised anew by chemical, spectrographic and metallographic study of iron objects found in prehistoric sites near Clarkesville, Va., and in the mounds near Columbus, Ohio.

Composition of the iron, the method of carburizing the outer surface, as well as the way of forming the implements make some experts feel sure that they are not of modern manufacture.

Interested in determining just how ancient these iron objects may be is Capt. A. H. Mallery, Washington industrial engineer, who has devoted a large share of his time for many years to the pursuit of his hobby, which is tracing evidence for Viking and perhaps even earlier cultures in America before the time of Columbus.

Capt. Mallery, who has skippered ships in northern waters, has collected specimens of ancient iron from Greenland, Labrador, Newfoundland, as well as from Virginia and from the Ohio mounds.

Samples of this material have been sent by Capt. Mallery to the National Bureau of Standards and to Battelle Memorial Institute, Columbus, Ohio, for metallurgical study. Experts at both the National Bureau of Standards and at Battelle have found that the specimens are definitely not modern, although it is difficult to assign a precise date to them because no articles of comparable antiquity of known date are available for comparison.

Dr. George A. Ellinger of the National Bureau of Standards believes the specimens found in the Ohio mounds to be definitely pre-colonial. Dr. A. M. Hall, of Battelle, found that a shovel from Ohio that he tested was not modern; it could be of colonial times or it could be older. A mineral coating formed on the surface of the tool as result of the soil in which it lay buried could account for its having been preserved for a great length of time, Dr. J. C. De Haven, of Battelle, said.

The Virginia site was found when archaeologists of the River Basin Surveys of the Smithsonian Institution combed over the area in southern Virginia and northern North Carolina to salvage any possible archaeological remains before the area should be flooded by the Buggs Island Reservoir and dam.

Stone points were found there that were made by a Folsom culture people. These points were like those found in the western part of the United States and believed to be 10,000 years old.

In the same area there were found scattered over considerable land, bits of iron, nails, horseshoes, hinge fragments and occasional tools. One specimen from this find was submitted by the Smithsonian to Dr. Ellinger for evaluation. Detailed study revealed that it was not made within the last 200 years.

Early history of the region does not reveal any mention of a colonial iron furnace or smelter there, the report states.

Later, Capt. Mallery, digging on the same site, unearthed an ancient iron furnace of a design which he says was like one found in Belgium that dates back to the time of the Romans. In the Virginia furnace he found slag and about 40 pounds of iron fragments which he found to be similar to those found in and near the Folsom sites by J. V. Howe, gunsmith who lives on the site, in connection with the Smithsonian study.

Analysis of the slag, Capt. Mallery reports, shows a 60% iron content, pointing to the antiquity of the methods used. Modern and colonial slag contains less than one half of one per cent of unrecovered iron, he says.

Capt. Mallery has compared the nails found on the Virginia Folsom site with iron nails dug up at the old Jamestown colonial settlement. They differ markedly in shape, he reports. On the other hand he finds them markedly like the rivets used by Vikings for holding together the oak planks forming the hulls of their boats. They are of a soft iron that could be hammered cold because hot iron would set fire to the wood and make the rivet loose. Similar nails, he says, were recovered from the so-called Oseberg ship which is dated at 600 A.D.

The finding of this ancient iron opens up the whole question of whether America did have an "Iron Age" before the Spanish and English colonists brought iron tools and weapons with them to the New World. Archaeologists have long believed that iron was unknown on this continent in pre-Columbian days.

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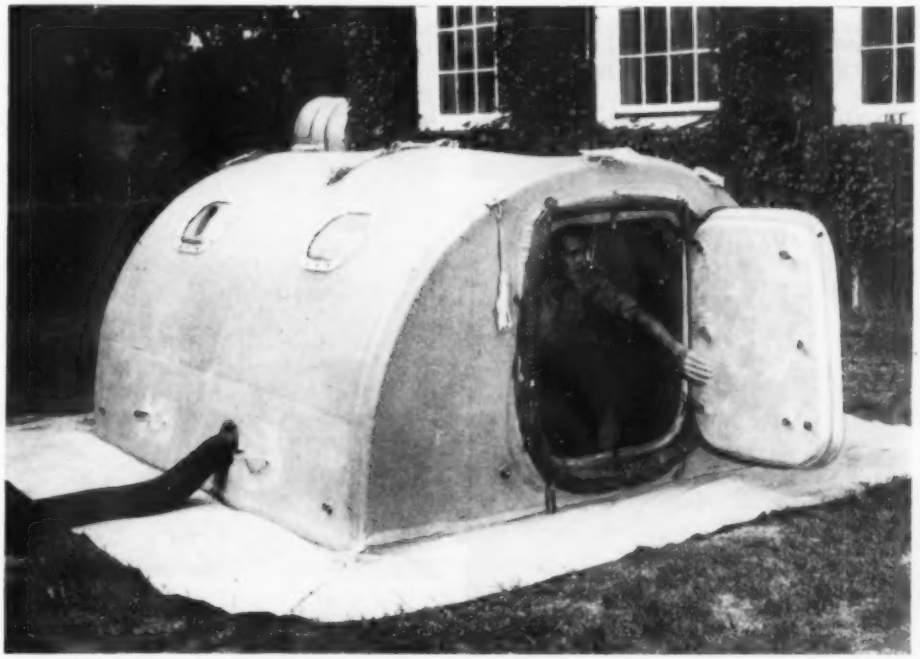
ENGINEERING

Air Pressure, Not Braces, Support Quonset Hut

➤ A FOUR-MAN quonset hut, for use by stranded airmen in the Arctic, is made of cotton fabric, has no frame but can be put up with a hand air pump, it was revealed at Wright-Patterson Air Force Base, Dayton, Ohio. It is a development of the Air Force in conjunction with the U. S. Rubber Company.

The structure has no internal braces. It is supported in upright position by air pressure on the inside. Some 1.5 pounds pressure is all that is needed. It is made



QUONSET FOR ARCTIC—This shelter for stranded airmen unfolds from a compact bundle when blown up with a simple hand pump.

of inch-thick, two-layer cotton fabric coated with a low-temperature Neoprene compound that will withstand extreme cold. The dead-air space between the two layers provides the insulation.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Meson Predictor Nobelist

➤ THE 1949 Nobel Prize winner in physics, Dr. Hideki Yukawa, predicts that there may be many more elementary particles similar to the meson which he won fame by predicting. The Japanese physicist predicted an elementary particle 200 to 400 times as heavy as the electron in 1934, three years before it was found in experiments with cosmic rays.

Dr. Yukawa also predicts that these heavier "tau mesons" will be 800 to 1000 times as heavy as the electron, but will be extremely hard to detect experimentally because they live only one one-hundred-billionth of a second.

The original meson was predicted in 1934 as a means of explaining the attraction between protons and neutrons in the nucleus of atoms. When the predicted particle, with a mass 285 times the mass of the electron, was discovered in 1937, one of the names suggested for it was "yukon" in honor of Dr. Yukawa. "Meson", the name finally selected, was chosen because the particle is medium weight, heavier than the electron but lighter than the proton.

It was early suspected that the meson was more than one particle, and this suspicion was confirmed in 1947 by the discovery in cosmic rays of a slightly heavier meson 315 times heavier than the electron. It was called the pi meson. Pi mesons act as the binding force in the nucleus, as Dr. Yukawa originally predicted, and they decay into the lighter mu mesons, which were discovered in cosmic rays earlier, in 1937.

Pi and mu mesons have either positive or negative charges. There is also evidence for a neutral meson with a mass close to that of the pi meson.

At the present time, this extremely active branch of theoretical physics suffers from too many possible mesons. All may be predicted from different variations of the theory which Dr. Yukawa helped to develop, but physicists cannot yet say which theory is the right one. It will be very difficult to find the whole family of these elusive particles by experiments alone because most of the heavier mesons, if they do exist, must decay too quickly to be observed by any of the methods now in use.

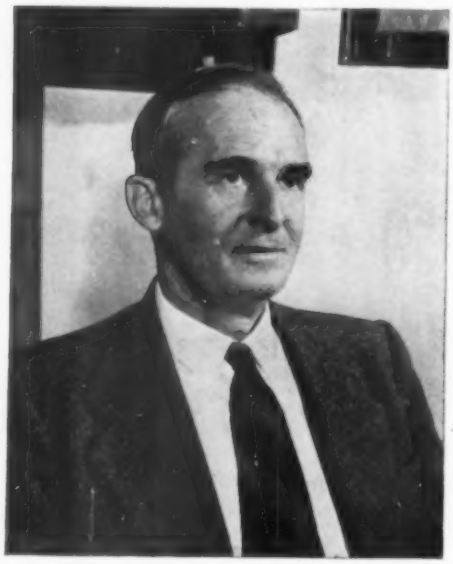
Science News Letter, November 12, 1949

DR. HIDEKI YUKAWA

CHEMISTRY-PHYSICS

Low Temperature Study

➤ THE lowest temperatures ever reached by man, less than one one-hundreth of a degree above absolute zero, corresponding to 459.6 below zero on the Fahrenheit scale, are due to the researches for which Dr. William F. Giauque of the University of California won the 1949 Nobel prize for chemistry.



DR. WILLIAM F. GIAUQUE

One of the world's pioneers in low temperature research, Dr. Giauque proposed over 20 years ago the method of cooling below the temperature of liquid helium that uses what is known as the "adiabatic demagnetization of paramagnetic salts."

Dr. Giauque is planning a laboratory at the University of California which will contain the most powerful magnet in the world. For extending his low temperature researches, under the sponsorship of the Atomic Energy Commission and the Office of Naval Research, he hopes to build a one-hundred thousand gauss magnet. A gauss is a unit of magnetic attraction.

Before the award of the Nobel prize to Dr. Giauque, the University of California had earmarked half a million dollars for construction of the building in which the low temperature laboratory will be housed.

The most powerful magnet now in existence is a 40,000 gauss magnet at Leiden, in Holland. It was there that the first low temperature experiments were conducted about 40 years ago, including a test during which an electrical current was made to flow unimpeded for hours.

This persistent current experiment—a sort of "perpetual motion"—has also been startlingly demonstrated by R. B. Scott at the National Bureau of Standards. Cooling a lead saucer to about four degrees above absolute zero, a bar magnet is brought close to the saucer. This sets up an electric current in the lead which resists the further movement of the bar magnet toward the saucer. The magnet then floats above the saucer, literally suspended by nothing, like the legendary Mohammed's coffin.

So far no practical application of this achievement has been developed, but it is considered of great interest in understanding the properties of matter at very low temperatures. Some engineers have visualized transmission of electrical power with little loss over wires if they could be cooled down to the very low superconducting temperatures, which are far below ordinary frigid temperatures.

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CHEMISTRY

$25,000 Prize Announced For New Facts on Sugar

➤ ONE of the largest prizes of the scientific world, $25,000, will be awarded again next year in recognition of new knowledge about sugar or other carbohydrates, Dr. Harlow Shapley, chairman of the National Science Fund of the National Academy of Sciences in Washington, has announced.

The 1950 grand prize of the Sugar Research Foundation Inc., will be open for entries until Feb. 1. Scientific studies of sugar in living processes, as a food and as industrial raw materials, are being stimulated by the award. Four previous prizes annually have been given.

Science News Letter, November 12, 1949

MEDICINE

Hormones Aid Cancer Ills

Temporary improvement was noted in six patients with cancerous diseases after treatment with the scarce hormones, cortisone and ACTH.

➤ SIX patients with cancerous diseases, leukemia, Hodgkin's disease and lymphosarcoma, have gotten better, at least temporarily, thanks to treatment with the two new but scarce hormone chemicals, cortisone and ACTH. These are the hormones which have won wide acclaim for their beneficial effects in rheumatoid arthritis.

Two more patients with cancer itself, one in the breast and one in the prostate gland, have been given ACTH treatment and may have been helped by it, though there was no obvious response to the treatment.

These trials of cortisone and ACTH were reported by Drs. O. H. Pearson, L. P. Eliel, Rulon W. Rawson, Konrad Dobriner and C. P. Rhoads of the Sloan-Kettering Institute and Memorial Hospital, New York, at the meeting of the American Cancer Society in New York.

None of the patients was cured. None had a "complete clinical remission," the doctors reported, meaning that none was entirely well even for a temporary period. But two patients with lymphatic leukemia who had relapses when the hormone treatment was stopped improved again when given a second course of treatment.

The hormone chemicals were given four times a day for from 18 to 30 days. In the six patients with lymphomatous tumors, there was "a dramatic and progressive decrease in the size of enlarged lymph nodes of enlarged spleens" while they were getting ACTH or cortisone. Definite shrinkage of lymphoid masses was first apparent after three days of ACTH and six days of cortisone. Two of these six patients, one with lymphatic leukemia and one with lymphosarcoma, have shown no sign of regrowth of abnormal masses within a period of 10 weeks since the ACTH was stopped.

None of the patients was critically ill when the treatment was started. All of them noticed an increasing feeling of well-being during the first two weeks of the treatment, and an increase in appetite during the first week.

"In three patients hunger became a major complaint," the doctors reported.

All of the patients noticed muscular weakness after two weeks of the treatment and all developed edema, or dropsy, which rapidly disappeared after the treatment was stopped. One female patient developed a severe acne on her face, arms and trunk which persisted for several weeks after the ACTH treatment was stopped. She also had an increased growth of hair on her face, but no other signs of masculinizing effects.

The great scarcity of ACTH and cortisone, with no hope for any increase for perhaps years to come, was stressed by the physicians and by representatives of Armour and Company and Merck and Company which make ACTH and cortisone respectively.

Even if and when more of the chemicals are available, great care will be needed, the doctors pointed out, to avoid side effects which may include severe nervous disorders and the condition known as Cushing's syndrome. This is characterized by water retention and dropsy, a moon-like face, buffalo neck, marked increase in blood pressure, growth of beards on women and diabetes.

The reason for trying these two chemicals and hoping they might be effective in cancer and cancerous diseases is that previous studies have shown a relation between cancer and disturbance of the adrenal glands. Cortisone is a product of the adrenal glands and ACTH is a pituitary gland hormone which stimulates the adrenals to produce cortisone.

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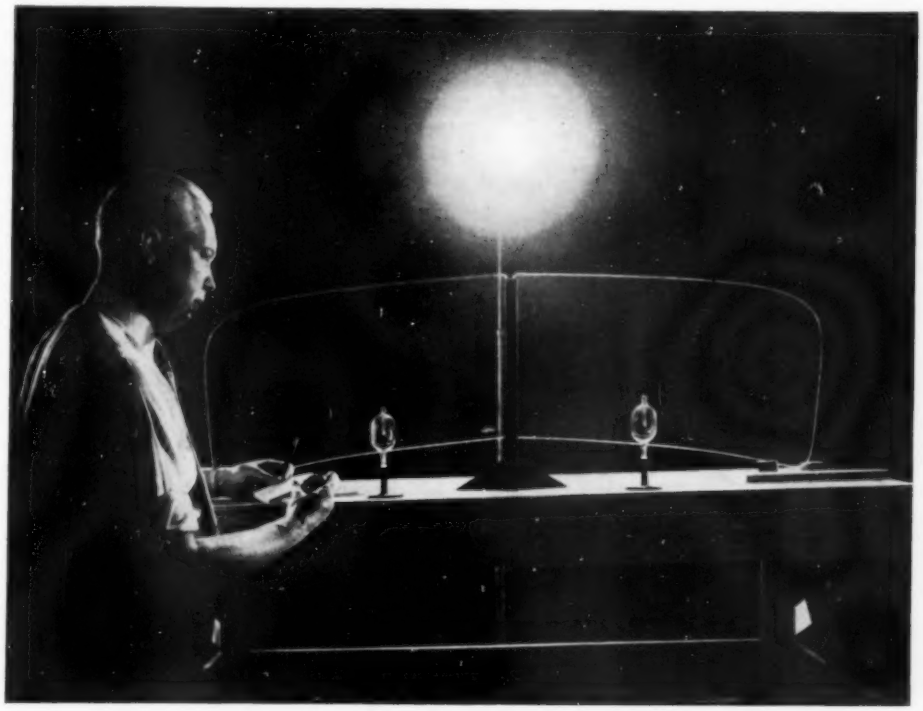

GLASS CUTS GLARE AND HEAT—The comparative heat from an artificial sun coming through the new windshield glass on the left, is being measured and compared with that which comes through the ordinary safety plate glass on the right.

ENGINEERING

Glare and Heat Reduced By New Automobile Glass

➤ LESS glare and heat are promised with a new glass for automobile windshields and sidelights developed by Libbey-Owens-Ford Glass Company, Toledo, Ohio. It is a safety plate glass with a slight bluish-green tint derived from chemicals mixed with the raw materials in manufacture.

This new glass kills much of the glare that comes from bright sunshine in the daylight sky and thus reduces driver's eye fatigue, it was stated by G. P. MacNichol, Jr., of the company's staff. The ability of the glass to reduce the input of heat rays is a helpful contribution to comfort of driving on hot sunny days. Tests showed the glass reduced infra-red transmission by 15% or more. It also reduces upholstery fading by shutting out a large percentage of ultraviolet rays.

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As a rule, *moths* fly only at night and *butterflies* only in daytime.

Extreme altitudes are sometimes measured by the changing boiling point of a liquid with changes in pressure.

The *Virgin Islands*, with 133 square miles of area, cost the United States about 3.5 times the total paid for Alaska which has 586,400 square miles.

MEDICINE

Plastic Sponges Fill Hollow Lung Cavity

➤ PLASTIC sponges now on the market for washing faces, dishes and even the family car may turn out to be just what the doctor orders for a patient who has had a lung removed because of disease.

Preliminary tests at the Mayo Clinic, Rochester, Minn., show the plastic sponge to be "the most promising material yet studied" for a permanent false lung to fill the space left in the chest when a lung is removed.

In such cases the body tries to wipe out the space by a raising of the diaphragm, a shift of the partition between the lung sacs, narrowing of the spaces between the ribs and over-expansion of the remaining lung tissue. Usually these changes do not cause any serious disturbance or disability, especially in young people. But in cases where the operation has been performed for tuberculosis, the over-expansion of the remaining lung tissue is not so good. And cancer of the lung, chief condition for which an entire lung is removed, occurs most often in older patients who do not have very elastic tissues and consequently can stand least well the over-expansion of the remaining lung.

A bag of plastic material (polyethylene film) filled with spun glass and air and a hollow, lung-shaped job of a molded methyl methacrylate plastic had previously been tested. Both were satisfactory in some respects but the polyethylene bags eventually broke and the plastic molds did not fit the lung cavity well.

The plastic sponge is trimmed with surgical scissors to fit the space left when the real lung is removed. It is then moistened with a solution of salt containing penicillin and then stitched to the lining of the chest wall. The sponge itself is derived from formalinized polyvinyl alcohol and sold under the tradename, Ivalon.

Trial of these sponges in dogs was successful enough to warrant their use in selected human patients, Drs. John H. Grindlay and O. Theron Clagett reported at a staff meeting of the Mayo Clinic.

Science News Letter, November 12, 1949

DENTISTRY-NUTRITION

Norwegian War-Time Diet Gave Children Better Teeth

➤ FISH, carrots and potatoes instead of more artificial carbohydrate foods gave Norwegian children better teeth during the war.

Dr. Gutterm Toverud, professor of pedodontry at the Dental School of Oslo, Norway, now in this country, has reported this information to the American Dietetic Association in Denver, Colo.

Dental decay in Norwegian children decreased 60% to 80% during World War II, he found. This decrease in decay resulted partly from the war-time diet which contained a low amount of refined carbohydrates, especially sugar and the sugar products. Norwegians also ate more of the natural foods such as fish, salted herring, potatoes, and carrots—foods high in calcium, phosphorus, iron and viatmins A, B, C and D.

Since 1945, dental decay in pre-school children has increased 30% to 40%, Dr. Toverud found. Dental examinations have been made annually since 1940 on 8,000 to 9,000 Norwegian school children, aged seven to 14 years. An even greater reduction of caries during the war years was noted in two and a half to seven-year old children, Dr. Toverud stated.

Prevention of tooth decay depends on the strong resistance of the teeth and on the small percentage of carbohydrate particles on which the bacteria in teeth crevices can act. These factors were present in Norway during the war years, Dr. Toverud explained. The minerals present in the natural foods built up good resistance of the teeth to decay, while lack of carbohydrates in the diet lessened the amount of bacterial activity.

Science News Letter, November 12, 1949

NUTRITION

School Lunches Now Served Children Overseas

➤ SCHOOL LUNCHES, such as we have here, have gone abroad, although the menus vary greatly in the different countries, Marjorie L. Scott, nutrition officer of the Food and Agriculture Organization, United Nations, reported to the American Public Health Association in New York.

In the United Kingdom a complete hot meal is served to over half of the school children, she said. In addition, many children also receive milk, a program started before the war.

Belgium and the Netherlands among others, where the custom is for the child to have all his meals at home, supply only milk during the school day.

Greece has recently started a school breakfast which consists of a cup of hot milk cocoa and a slice of milk raisin bread.

In Bangalore, India, experiments on a group of school children showed that soy products are less desirable than cow's milk in supplementing the rice diet.

School meals in Singapore, Malaya, and Java, are based on cereals such as lightly-milled rice, high extraction wheat and millets, and the small fish called pulse to provide calcium, as well as green leafy vegetables, and an oil containing carotene.

A simple snack of milk and crackers was advised, at a conference in Montevideo, for countries unable to provide full meal service in schools.

These programs are being encouraged with financial aid and technical assistance by FAO in many other regions where malnutrition is prevalent.

Science News Letter, November 12, 1949

IN SCIENCE

CHEMISTRY

Mercury Vapor Poisoning Prevented by New Device

➤ AN ordinary toy balloon and a vacuum-packed coffee jar are helping glass blowers in the laboratory escape the danger of poisoning from mercury vapor fumes that appear when glass vacuum apparatus is undergoing minor repairs.

Developed at the physics department of the Illinois Institute of Technology, Chicago, Dr. James J. Brophy reports in the REVIEW OF SCIENTIFIC INSTRUMENTS (Oct.), that this device has been in successful use for some time.

Two pieces of copper tubing are soft soldered to the metal cap of a vacuum-packed coffee jar. An ordinary toy rubber balloon is held to one of the tubes inside the jar by a rubber band. From the other end of this copper tube rubber tubing leads to the glass blower. The other copper tube is connected to the glass vacuum system.

When the glass blower blows through the rubber tubing, the balloon expands and forces the air in the jar into the vacuum system, yet protects the blower from dangerous mercury vapor.

Glass blowers in a laboratory are highly skilled technicians upon whom the success of experiments being conducted by scientists depends. Many studies are made at much reduced pressures in apparatus containing mercury, and the danger from poisonous mercury vapor in repairing is great.

Science News Letter, November 12, 1949

OPTICS

Artificial Sapphires Are Now Made into Lenses

➤ ARTIFICIAL sapphires can now be made into lenses for microscopes and cameras, and it is expected that these jewel lenses will be of particular use in correcting optics for color transmission.

Dr. Robert E. Hopkins and Brian O'Brien of the University of Rochester's Institute of Optics reported to the Optical Society of America in Buffalo, N. Y., that a lens of one-inch focal length and f/1.5 has been constructed with two sapphire elements.

Sapphire of acceptable optical quality has been manufactured in sizes up to 20 millimeters diameter. Methods of polishing this material which is harder than glass have been worked out.

Manufacture of artificial sapphires was begun in this country during the war to provide hard and long-wearing bearings for precise instruments needed in military work.

Science News Letter, November 12, 1949

NCE FIELDS

GEOPHYSICS

Picturing Earth's Shape From Gravity Differences

➤ TWO scientists at the University of Wisconsin are busy with computations which they hope ultimately will give the exact shape of the earth.

Prof. George Prior Woollard, University geophysicist, and Norman C. Harding, a graduate student, are correlating gravity measurements taken at different points on the globe by Mr. Harding and other graduate students during the summer.

Since the earth is of irregular shape, being pumpkin-shaped rather than perfectly spherical, the pull of gravity varies by minute but measurable differences. From measurements of these differences recorded from many points on the earth's surface, scientists will be able to make an exact model of the earth showing all its bumps and wrinkles.

However, it will take many thousands of such measurements and long and painstaking correlation of them before this point is reached. Prof. Woollard, who instituted the project in 1940, has traveled all over the northern hemisphere taking measurements. Mr. Harding took readings at some 400 different places throughout South America and Alaska on his expedition this summer.

Although the theoretical basis for relating earth size to varying gravitation has been known for a hundred years, it is only recently that the development of a portable, accurate gravimeter, the gravity-measuring instrument, made extensive field work possible.

Many other organizations are engaged in collecting gravity measurements all over the world. In this country, the U. S. Coast and Geodetic Survey is making an intensive study of gravity differences in the Midwest. Some day it is hoped all these figures will add up to the exact shape of the earth.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Static Electricity Being Fought with Alpha Rays

➤ RADIOACTIVE materials are being used to fight the danger of fire from static electricity produced in many industrial operations, Dr. John E. Silson of the New York State Department of Labor told the American Public Health Association in New York.

Alpha rays, composed of the nuclei of helium atoms, have been found effective for this because they ionize the atmosphere and thus break up the static charge, he said.

But this has created a new danger to health because radium is the material used as source of the alpha rays. The danger is from the beta and gamma rays which radium also gives off.

This danger from gamma rays can be held in check by the simple precaution of keeping workers a safe distance from the radioactive material, Dr. Silson pointed out. Shielding he called impractical because it would require great thickness of lead.

He recommended film badge monitoring which shows how much radiation is hitting the body of a worker as a check on the control measures being used.

Science News Letter, November 12, 1949

CHEMISTRY

Many Products from Fat To Come from Unique Plant

➤ HUNDREDS of products of fat, plain animal fats from meat packers and markets, are to be obtained at an unique new plant opened in a nearby Chicago suburb by Armour and Company. While glycerin will be the principal product, there will be a long list of old and new chemicals in addition.

The new plant is intended to process up to 100,000,000 pounds of fat a year. From the fatty acids obtained many products will be made by conversion into amides, nitriles, amines and other substances. Applications of products will range from better detergents for cleaning to waterproofing for concrete, improved binder for asphalt roads and for use in recovering iron from its ore.

The work of the new institution will be based on years of study of each of the acids found in fats and the various chemical variations possible for them. Edible fats have been used largely as lard and other shortening and in margarine. Inedible fats have been used mostly in soap making but they have been used also in lubricants, cutting oils, candles and a few other purposes. The present plan is to find more worthy uses for the fatty acids.

A fat molecule consists of a molecule of glycerin holding together three molecules of acid which may be all different. The types of acids depend upon the source of the fat. In this new plant steam is fed into the top of a high tower under 700 pounds pressure per square inch and at a temperature of 450 degrees Fahrenheit. Liquid fats are pumped up from the bottom. The glycerin is separated, washed out and recovered at the bottom. The mixed acids emerge from the top.

The mixed acids may be converted into amides by mixing with ammonia and heating, then into nitriles by the use of high temperatures, and finally into amines by hydrogenation. However, the various acids may be separated from each other in the high vacuum fractional distillation section of the plant, on the basis of the differences in their boiling points.

Science News Letter, November 12, 1949

PALEONTOLOGY

Prehistoric Sea Cow Skeleton Is Unearthed

➤ SCIENTISTS now have their hands on the first skeleton of a rare beast of the prehistoric world, a 30,000,000-year-old sea cow, which had been known only from fossil skull fragments and curious peg-like teeth.

The animal was the ancestor of the modern sea cow and, like his offspring, he was a stupid, ugly and ungainly beast, having an appearance something like a cross between a hippopotamus and a small whale.

Paradoxically, the sea cow appears to have inspired the creation of one of the loveliest individuals in mythology, the mermaid. True, the sea cow had a flipper, but here the resemblance ends.

The skeletal remains of the prehistoric sea cow were unearthed near the California town of Coalinga by Roy H. Reinhart, teaching assistant in paleontology. The remains will make it possible for Mr. Reinhart to make the first definite assignment of the animal's place in evolution.

Mr. Reinhart says the sea cow apparently has always been rare on the earth. Only two skulls, two partial jaws and some teeth of the prehistoric animal had been unearthed prior to the Coalinga find.

Two genera presently inhabit the earth: the Manatus along the coast of Africa and from the West Indies to central South America on the Atlantic Coast; and the Dugong from the Philippines and Australia to Madagascar and the Red Sea.

Science News Letter, November 12, 1949

BIOCHEMISTRY

Cows' Thyroid Gland Size May Be Key to Milk Yield

➤ SOUTHERN cows give less milk than northern cows, on the average. Southern cows have smaller thyroid glands than northern cows, on the average.

Dairy scientists of the U. S. Department of Agriculture, placing these two facts side by side, speculate that there may be some connection between them. Although they are not sure, they think they are on the trail of something better than a mere hunch. Here are some of the facts that make them think so:

1. Cows fed with thyroxine often give more milk.
2. Thyroxine is a substance secreted by the thyroid gland.
3. In some animals, environmental temperature is known to affect thyroid activity.
4. Diet and heredity may also affect thyroid activity.

Intensive research into the thyroids of cows in relation with their environment, diet and heredity is on foot already in the hope that some day southern cows will produce as much milk per cow as their northern cousins.

Science News Letter, November 12, 1949

ANTHROPOLOGY

Scale for Cultures Traced

A similar evolutionary pattern exists for both the Old and New Worlds. Only the actual dates of the eras, beginning with the primitive, differ.

By MARJORIE VAN DE WATER

➤ CIVILIZATION followed the same pattern of development in all the world centers of civilization. The peoples of the new world as well as those of Egypt, Mesopotamia, and China went through the same eras in their growth toward the peak of their culture.

They all began with a period in which they lived primitively on wild game and wild fruits and other foods. They reached a climax with empire building. The pattern followed in this development has been traced by Dr. Julian H. Steward, anthropologist of Columbia University.

This is the first time that a single scale has been worked out for the cultures of both Old and New Worlds. Most American anthropologists have previously attributed such similarities as have been found to cultural diffusion in some unexplained manner rather than as a natural sequence of events occurring as cause and effect in the course of a similar evolution.

Cradles of Civilization

Six world centers have places on Dr. Steward's scale of development. He chose them because they were the cradles of civilization and because culture was facilitated by the fact that all were in arid or semi-arid regions. The scale appears in AMERICAN ANTHROPOLOGIST.

The idea that the arid soil made farming very difficult and that the problem of living in such dry regions stimulated cultural development is a mistake. On the contrary, the dry soil facilitated culture because it was easily tilled by a digging-stick and irrigation farming.

Other parts of the world such as the tropical rain forests, the northern hardwood forests and the sodded plains areas could be tilled only with the greatest difficulty by people who lacked iron tools.

But before the people knew how to farm all these cradles of civilization went through a period of living by hunting and gathering. In those days all of man's energies had to be devoted to satisfying the biological needs for food, clothing and shelter. Simple crafts of pottery, basketry, weaving and permanent housing were unknown. This era came first in all the world centers, but the actual dates were different. In the Old World people emerged from this era much earlier than they did in the New World. The dates set by Dr. Steward, which are only roughly approximate, are 8000 B. C. for Mesopotamia, 7000 B. C. for Egypt, about 5000 B. C. for China, 2000 B. C for Northern Peru and not until about 1500 B C. for Middle America.

Then the Indian in Peru began to plant beans and dig himself a semi-subterranean house. In Mesopotamia the people probably domesticated millet or wheat and maybe also domesticated animals. In Egypt they may have domesticated plants and traces have been found to indicate that they did make pottery. This era lasted until about 5000 B. C. in Mesopotamia and until about 500 B. C. in Middle America.

As farming in these arid regions developed, there was a need to reckon seasons and forecast the rise and fall of rivers and other such aspects of the understanding of nature This led to the forming of an upper class of individuals with knowledge and magic. Increasingly efficient farming made it possible for the farmer to raise more than he needed to eat himself and left a share to be contributed to the upper ruling class.

Increasing population brought a need for political integration and this led to the creation of small states ruled by the religious leaders. In the Old World, the more important domesticated animals, except the horse, were present from early in this "formative" era. In the New World, however, the absence of suitable wild species for domestication limited such animals to the dog and in the Andes of Peru to the llama and alpaca.

Irrigation was still on a local scale, and control of it was one of the more important practical functions of the religious leaders.

During the "formative era," all centers of civilization developed ceramics, loom-weaving, basketry, metallurgy (except in Middle America) and the construction of houses and religious edifices.

Regional Development

Following the formative era there came the era of "regional development and florescence." No new technologies were invented but irrigation works were enlarged, releasing a larger portion of the population for intellectual interests. At this time the largest religious edifices were built and the finest art and manufactures of any era were produced, each region producing distinctive styles. These products were dedicated principally to the upper classes which were still religious and to the temples.

Wheeled vehicles appeared in the Old World during this era. The wheel was used on toys in this same era in Middle America, but was not used in transportation, probably because of the lack of draught animals. Every New World center developed roads, boats and canals to a degree of efficiency which enabled them to achieve states as

NEW WORLD CIVILIZATION—The great temple of the Warriors in Chichen Itza, Yucatan, was built in the era of militarism and empire building.

OLD WORLD CIVILIZATION—A parallel in the Old World is the tomb pyramid of the Warrior King Chephren built in the same era as the Yucatan temple. An interesting feature of these military-religious edifices is that the cubic content of each is greater than that of the total of all the private dwellings of the people who built them.

large as those of the Old World.

The priesthood, devoting full time to religious matters, laid the foundations of astronomy, writing and mathematics in all centers.

Militarism had its birth in this era, and it was with the help of the military that the rulers were able to extend their authority over subject states and enlarge their irrigation works. A temporary decrease in population probably followed the initiation of large-scale warfare.

Then followed the era that Dr. Steward calls the era of "Cyclical Conquests." This was a time of empire building and large scale militarism. Now cities were founded in all the world centers. Trade developed within empires and even beyond, and in some centers money was used. The principal change in manufactures was a strong trend toward standardization and mass production. In some centers there was a military class and captives of war became slaves.

Then population pressure and abuse of the common people brought rebellion, which destroyed the empires and returned society to local states and a period of dark ages. Irrigation works were then neglected and population decreased.

This empire-building era was ended in the Old World with coming of the Iron Age. In the New World it was interrupted by the Spanish Conquest. That ended the natural development of the native American culture, and pre-Columbian civilization.

Science News Letter, November 12, 1949

AERONAUTICS

Helicopter Gets Capsule

➤ A PROJECTED "capsule-carrying" helicopter will join forces with a capsule-carrying airplane to deliver freight from an airport near its source to out-of-the way places where planes can not land. The capsule in this case is an attachable and detachable cargo compartment about the size of the body of an ordinary overland passenger bus.

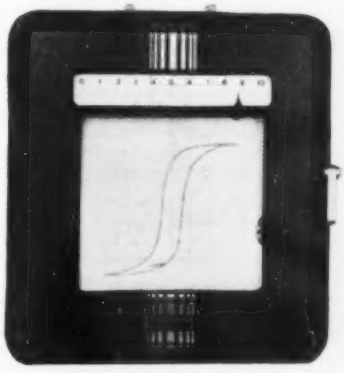
The capsule-carrying plane was announced a year or so ago by the Fairchild Engine and Airplane Corporation, Hagerstown, Md., its designer and builder. The planned helicopter capsule-carrier has just been revealed in PEGASUS, publication of the Fairchild company, but it is to be constructed by Piasecki Helicopter Corporation, Morton, Pa.

The airplane will carry the cargo compartment to the airport nearest to the final destination, and deposit it upon the runway. The helicopter will pick it up at that point and take it, without having to reload, on the final section of its route. This could provide easy and quick transportation of needed equipment or supplies from manufacturers to users, particularly to American soldiers who, in another war, might find themselves in a hard-to-get-at location.

The carrier plane is a version of the Fairchild Packet, now widely used as a cargo ship by the armed services. In it the box-car-size cargo compartment which forms the lower part of the ordinary Packet, is omitted and the space is available for the detachable capsule. The operating part of the plane remains about the same. The main landing wheels of the new version are at the end of struts long enough to permit the plane to straddle the capsule as it rests on the runway. Mechanism is provided by means of which the capsule is raised to become the "belly" of the carrier, to which it is firmly attached.

The helicopter to be used, which will probably be ready for tests within two or three years, will also be able to straddle the capsule. It will be somewhat like the type of helicopters built by Piasecki and now in service in that it will be an elongated affair with overhead lifting and propulsion rotor blades at front and rear.

Science News Letter, November 12, 1949



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METALLURGY

Molybdenum for Jets

➤ THE American metal molybdenum promises to play an important part in high-speed aviation in the near future. Researches at Battelle Memorial Institute, Columbus, Ohio, show that this metal can be used more largely than at present in the construction of jet and rocket engines to operate at the extreme high heat necessary for efficiency.

The attainment of more compact and efficient power plants depends, in part, on the perfection of heat-resisting materials superior to those available today, Robert M. Parke, Battelle's specialist upon refractory metals, points out. Extensive investigations are being conducted, with Office of Naval Research support, with the primary objective of raising the usefulness of molybdenum to a level consistent with its abundance.

Present requirements for heat-resistant metals are being met largely by alloys in which iron, nickel, or cobalt are major constituents, Mr. Parke states. To make any substantial increase in the operating temperature of the metal parts of heat engines, a metal must be selected which has a melting point greater than that of iron, nickel or cobalt. These are 2,800 degrees, 2,700 degrees, and 2,650 degrees Fahrenheit, respectively.

All metals with melting points above 2,800 degrees are either difficult to fabricate or scarce, or both. Molybdenum has a melting point of 4,750 degrees. It is abundant, particularly in the United States. Although not now easy to fabricate, it seems certain that improved methods will be found. This is one of the problems that Battelle Institute hopes to solve.

In addition to its high melting point, molybdenum has other properties which can be expected to contribute to its sucessful use as a heat resistant metal in aviation power plants and other applications. It conducts heat about twice as well as iron and its coefficient of thermal expansion, its rate of expansion when heated, is among the lowest of pure metals. The magnitude of these properties will aid in preventing distortion due to high heat.

One disadvantage of molybdenum is its inability to resist rapid oxidation above 1,400 degrees Fahrenheit in air. Above this temperature it forms an oxide that evaporates as rapidly as it is formed, thus giving no protection to the metal. This constitutes another problem to be solved, but solution is promised.

Science News Letter, November 12, 1949

DEAF?

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• Thousands needlessly suffer the handicaps that deafness brings. They spend their lives in lonely isolation, cut off from family and friends—from social and business success.

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NUCLEAR PHYSICS

New Platinum Isotope Exceeds First Find

➤ THOUGH you woudn't be able to find it even on careful examination of your ring, a new isotope of platinum has been discovered.

An isotope is a substance or element having the same place in the atomic table as another but with a different atomic weight. Radioactive isotopes being produced by the atomic piles are valuable research tools, in studying cancer for instance, and many new ones have been artificially produced in recent years.

Discovery of rare, stable varieties of elements, such as this isotope of platinum, is rather unusual.

Existence of the platinum isotope of mass 190, has been confirmed by Wallace T. Leland of the physics department of the University of Minnesota. He found, however, a greater abundance than was reported by the original discoverers, Dr. H. E. Duckworth, Robert F. Black and Richard F. Woodcock of Wesleyan University, Ohio.

The new isotope was found by examining in a mass spectrograph vapor obtained by the evaporation of platinum from a heated filament covered with platinum. Its abundance is about one part in 10,000, instead of one part in 16,000 as previously reported.

Science News Letter, November 12, 1949

Words in Science—AC—DC

➤ ELECTRIC current is a flow of electrons. It is a continuous flow which may be all in one direction or back and forth.

When the electrons flow through the wires in one direction around the circuit, the current is called DC, which means "direct current." It is incorrect to speak of DC current, because the C in DC means current.

In AC—alternating current—the electrons move back and forth. But in most applications of electricity, it is not the electrons that are wanted at the far end of the line, but power and energy. There are plenty of electrons there already.

A wire, any metallic conductor, is full of electrons. All that is needed is to set them in motion.

The alternating current transmits a motion of the electrons, not the electrons themselves.

Science News Letter, November 12, 1949

YOUR CREATIVE POWER

How to use Imagination

by Alex Osborn

Each of us has two thinking minds—a so-called judicial mind and a creative mind. This book sets forth over 100 ways to make our creative minds do more for us at work and at home. In personal living, as well as in business and public affairs, there is a new recognition of the power of imagination. This book is the first truly to illumine this fact—the first to do justice to the creative potential, possessed by each of us, especially women.

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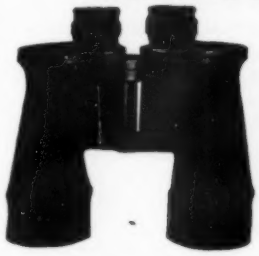

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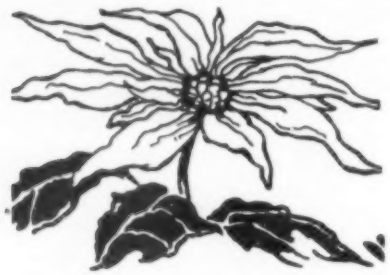

Poinsettia Pointers

➤ NOVEMBER is a critical time for poinsettias. Whether this festive plant will lend its flaming red bracts to the brightness of the Christmas season depends largely on how well it is spared certain pre-Christmas hazards.

Poinsettia goes by a variety of names: Christmas Flower, Easter Flower, Lobster Flower, Mexican Flame-Leaf. It grows wild in moist, shady areas of Mexico and Central America. In the tropics poinsettia gets short days and long nights. In the home, with electric lights and our modern habits of staying up long past the sun's bedtime, we are not likely without special effort to supply the natural rhythm of light and dark which brings out the best in the poinsettia.

To bring out this best, home-growers of poinsettia place the plant by a window so that it will get the maximum of November daylight. At night they cover the plant with a dark cloth, in much the same way that a canary might be put to sleep for the night.

Poinsettia, in addition to being light-sensitive, is very susceptible to extremes of heat and cold. For this reason, another far-sighted precaution is to maintain an even temperature in the room. Draughts or sudden temperature drops may cause the foliage to drop. Weekly applications of liquid manure are also helpful.

Of all these measures to induce the brightest display by Christmas, the most important is the regulation of light. Scientists of the U. S. Department of Agriculture have found that as little as an hour's exposure to minute quantities of light nightly for three weeks is enough to prevent flowering.

The red bracts of poinsettia are actually one of the two kinds of leaf that the plant produces. The other, of course, is the glossy dark green leaf that contrasts with the bracts in the traditional cheerful Yuletide colors. The flowers proper are tiny club-shaped objects at the center of the red bracts.

There is a large group of plants that share this distinctive manner of flowering which goes under the botanical name, euphorbia. One of these, a thorny type that is plentiful in Palestine and in the Mediterranean region, is prominent in the Christmas tradition of England. This is the famous Glastonbury thorn, reputed to be the staff of Joseph of Arimethea which he planted on the site of Glastonbury Abbey, and said to blossom only at Christmastide.

Science News Letter, November 12, 1949

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GEOLOGY

Study Coral Reef Origin

➤ MUCH battered Bikini, the A-bomb atoll in the Pacific, may once more become a proving ground, but this time to test out various geologic theories of the origin of coral reefs.

By drilling a hole 7,000 to 10,000 feet deep into the coral foundation, geologists hope to solve the mystery of the origin of such formations concerning which several conflicting explanations have been advanced since 1820 when coral reefs were first observed scientifically.

If funds needed in addition to those already offered by the Geological Society of America and the Office of Naval Research can be raised to finance the project, Dr. H. S. Ladd and J. I. Tracey, Jr., of the U. S. Geological Survey, believe that much more will be gained besides the settlement of the 130-year old controversy. Such a deep-drilled hole, they write in the SCIENTIFIC MONTHLY (Nov.), "would give valuable information on many fundamental geologic problems," among them the composition of the strata and the kinds of animal and plant life that inhabited the region ages ago.

Although all scientists agree that coral is the limestone skeleton of one of the lowliest creatures of the animal kingdom which slowly builds up into large formations over long periods of time, they have been unable to agree, Dr. Ladd and Mr. Tracey say, on an explanation of how these coral islands could grow so enormous as to project above the level of the sea.

Charles Darwin, the great 19th century founder of the theory of evolution, believed that coral reefs and atolls have formed on land that is slowly sinking into the sea. Carl Semper, a contemporary of Darwin, proposed the contrary view that the foundation of coral isles was slowly rising from the ocean bottom. In 1910 R. A. Daly suggested that during the Ice Ages the sea was much lower and the coral began to form when the banks were close to sea level.

Although modern students of the problem have gained much knowledge of coral structure by extensive geophysical, chemical and magnetic surveys, Dr. Ladd and Mr. Tracey point out that they still do not have enough evidence to decide which of the conflicting theories is correct.

Science News Letter, November 12, 1949

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CALCULATING INSTRUMENTS AND MACHINES—Douglas R. Hartree—*University of Illinois Press*, 138 p., illus., $4.50. Intended as a general introduction for those with no specialized knowledge.

CATALOG OF THE TERMITES (ISOPTERA) OF THE WORLD—Thomas E. Snyder—*Smithsonian Institution*, 490 p., paper, $3.00. The first modern catalog of the group.

CHEMICAL CALCULATIONS: For First Year Students—H. Stephen and S. S. Israelstam—*Edward Arnold*, 2d ed., 115 p., $1.50. Intended to be used in conjunction with lectures and laboratory work. The authors are at the University of Witwatersrand.

CHILDHOOD & AFTER: Some Essays and Clinical Studies—Susan Isaacs—*International Universities Press*, 245 p., $4.50. A collection of studies, partly technical psycho-analytical papers and partly on applications in the bringing up of children.

CHILDREN IN CONFLICT: Twelve Years of Psychoanalytic Practice—Madeleine L. Rambert—*International Universities Press*, 214 p., illus., $3.25. Revealing to parents what happens behind the closed door of the examining room when they take their child to a psychoanalyst and also what happens during the emotional development of the child. Foreword by Jean Plaget.

THE COMMUNITY OF MAN—Hugh Miller—*Macmillan*, 169 p., $3.00. A philosophical work in which the author expresses the belief that the political economies of the U.S.S.R. and the U.S.A. can associate.

FROM THE EARTH TO THE MOON and A TOUR OF THE MOON—Jules Verne—*Didier*, rev. ed., 256 p., illus., $2.95. An old classic in new dress.

IONIZATION CHAMBERS AND COUNTERS: EXPERIMENTAL TECHNIQUES—Bruno Rossi and Hans H. Staub—*McGraw-Hill*, 243 p., illus., $2.25. This volume of the National Nuclear Energy Series deals with the fundamental features of ionization and describes the construction of some typical detectors and their operations.

MAN AND THIS MYSTERIOUS UNIVERSE—Brynjolf Bjorset—*Philosophical Library*, 174 p., $3.75. Thoughts of a Norwegian who has travelled widely.

MANUAL OF SPECTROSCOPY—Theodore A. Cutting—*Chemical Publishing Co.*, 220 p., illus., $6.50. Written to assist those who wish to analyze ores and inorganic chemicals. Includes instructions for making an effective spectroscope.

THE NBS-NACA TABLES OF THERMAL PROPERTIES OF GASES: Table 2.10, Dry Air; Table 9.10, Molecular Oxygen; Table 11.10, Molecular Nitrogen—Harold W. Wooley—*National Bureau of Standards*, each 4 p., paper, free upon request to publisher by investigators having need of them.

PAVLOV: A Biography—B. P. Babkin—*University of Chicago*, 364 p., $6.00. Written by a pupil and associate of Pavlov, this book presents an account of his methods and discoveries.

THE PSYCHOANALYTIC STUDY OF THE CHILD, Vol. III-IV—Phyllis Greenacre and others, eds. *International Universities Press*, 493 p., $10.00. For those dealing with psychopathology in childhood. The twenty-one papers in this volume present a compilation of the latest psyochanalytic ideas on child study.

REVIEW OF CURRENT RESEARCH AND DIRECTORY OF MEMBER INSTITUTIONS 1949—*Engineering College Research Council*, 186 p., paper, $1.75. Over 4,000 current college and university research projects in engineering are included.

THE RIVERS OF MISSOURI—Dan Saults, Ed.—*Missouri Conservation Commission*, 100 p., illus., paper, 25 cents. Life along many beautiful rivers including the great Missouri and Mississippi.

SHIRAZ PAINTING IN THE SIXTEENTH CENTURY—Grace Dunham Guest—*Smithsonian Institution*, 70 p., 50 pl., $5.00. A study of paintings in the collection of the Freer Gallery of Art.

SOCIAL STRUCTURE—George Peter Murdock—*Macmillan*, 387 p., $6.00. Based on data from the Cross-Cultural Survey files supplemented by material on 165 additional societies to cover information on family, kinship, local groups, and marriage and sex behavior.

VARIETIES OF DELINQUENT YOUTH: An Introduction to Constitutional Psychiatry—William H. Sheldon—*Harper*, 899 p., illus., $8.00. A report based upon a ten-year study of delinquent youngsters in the Hayden Goodwill Inn, a Boston social agency. Dr. Sheldon's thesis is that a human being's behavior and personality are closely related to the structure of his body, and through reviewing the lives of 200 boys he tries to establish this.

Science News Letter, November 12, 1949

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⚙ *STEAM IRON for laundry work is a regular lightweight electric dry iron to which is attached a bulb-shaped four-ounce plastic reservoir. This fits on the back of the iron and makes instantaneous steam when the iron is flat on the ironing-board. Steam or dry ironing is obtained by a turn of a knob.*

Science News Letter, November 12, 1949

⚙ *ELECTRIC WORMER, to get bait without digging, is a rod-like device pushed into the ground and connected to an electric outlet. It can be used attached to an automobile engine spark plug if iron wire is wrapped around the car bumper and the other end stuck in the ground to complete an electric circuit.*

Science News Letter, November 12, 1949

⚙ *SANDING DEVICE for use on automobiles to give traction on icy roads, recently patented, is built about the muffler with its bottom sloping toward the rear. Operated from the driver's seat, a valved connection between the exhaust pipe and the sand delivery tube delivers distribution pressure.*

Science News Letter, November 12, 1949

⚙ *CHRISTMAS TREE ORNAMENTS, shown in the picture, and blocks for the youngster are made of styrene plastic in various colors and are safe objects for children to handle. Each lightweight, transparent ball contains a three-dimensional star or a figure suggestive of the holiday season.*

Science News Letter, November 12, 1949

⚙ *FAUCET FILTER, easily attached to the cold or hot water outlet at the kitchen sink, removes foreign matter from the water, including organic material, along with objectionable tastes and odors. It contains several layers of fine screen, each of different mesh, and layers of taste- and odorabsorbing chemicals.*

Science News Letter, November 12, 1949

⚙ *FROSTGUARD, to protect orchards from freezing, is a nickel-alloy kerosene burner and reflector combination, mounted on stilts between the fruit trees. By means of a special generator type burner and a combustion chamber, high heat is developed which is directed downward and outward by the reflector.*

Science News Letter, November 12, 1949

⚙ *HOSIERY-HANGER,* for drying stockings in a bathroom, *is a three-inch wide plastic shelf which has slots on the front side into which the stocking toes are inserted. Fixed to the wall with two screws, the hanger is available in colors to match bathroom color shemes.*

Science News Letter, November 12, 1949

⚙ *DOG LEASH, usable as a tethering device, has a metal stake on the outer end which can be easily forced into the ground, and a recoil spring in the leash itself cushions the shock when the animal lunges. A metal plate on the top of the stake, flush with the earth, holds it in place in spite of sidewise tugging.*

Science News Letter, November 12, 1949

Do You Know?

The *white starling* of Java has a touch of black on its wings.

Handicapped persons in 14 states are granted some form of tax exemption.

A substitute for *horsehair* for upholstery comes from cows; it is a curled fiber made from casein from milk.

A scientist has recently found that a good trained dog will kill 75 *field mice* in an orchard in one afternoon, while a cat is playing with the one she killed.

The so-called *New Hampshire Midget watermelon,* developed at the state university, is said to combine small size with high quality and to be suitable for the New England climate.

In the fall a chemical transformation takes place in the *leaf* of a tree; the green chlorophyll becomes colorless and is no longer able to hide the reds and yellows and other colors as it does during the growing season.

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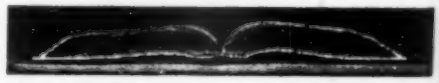

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